

Claims

1 1. A circuit configured to digitally control audio volume, comprising:
2 a register configured to receive previous and subsequent samples of an input
3 stream;
4 a digital filter configured to process the input stream in a manner that processes a
5 previous input sample during a time interval before a subsequent input sample, wherein,
6 by the time that the subsequent input sample arrives to the digital filter, the previous
7 sample has been suppressed by the digital filter to essentially zero, and wherein the
8 output of the digital filter is a series of exponentially decaying waveforms

1 2. A circuit according to Claim 1, wherein the digital filter is a single pole
2 digital high pass filter configured to output a previous input sample of the input stream in
3 an exponentially decaying manner, and, at the moment a subsequent input sample is
4 received by the digital filter, the digital filter substantially instantaneously outputs the
5 subsequent input sample.

1 3. A circuit according to Claim 1, wherein the digital filter is a single pole
2 digital high pass filter configured to output a previous input sample of the input stream in
3 an exponentially decaying manner until the voltage value of the previous input sample is
4 substantially zero, and, at the moment a subsequent input sample is received by the
5 digital filter, the digital filter substantially instantaneously outputs the subsequent input
6 sample in a similarly decaying manner.

1 4. A method of digitally controlling volume of an audio signal, comprising:
2 receiving an original input data stream;
3 generating a new stream of audio data by sampling the output of a high pass filter
4 operating between samples of the original input data stream, wherein the time constant of
5 the high pass filter is configured such that the original sample has decayed to essentially
6 zero before a subsequent sample arrives;

7 linearly varying the duration of time of the output sample relative to the input sample
8 with a user input parameter, wherein the high pass filter is a single pole response, where
9 output amplitude of the high pass filter is exponentially related to the duration of time.

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1 5. A method according to Claim 4, wherein the operation of the high pass
2 filter is sufficient to create an output of variable amplitude and, as the time of the output
3 sample is varied linearly, the amplitude of the output sample is varies exponentially.

1 6. A method according to Claim 4, wherein the user input parameter is a user
2 implemented volume adjustment.

1 7. A method of digitally controlling volume of an audio signal, comprising:
2 receiving an audio input signal in a first register (100) on the positive edge of a
3 first clock (C1);
4 adding the input signal (In) to an integrated sum signal (y3);
5 simultaneously generating derivative input signals (from shifters 106 and 107)
6 using shifters;
7 adding the simultaneously generated derivative input signals to generated a sum
8 signal (y2);
9 integrating the sum signal (y2) to generate the integrated sum signal (y3) in an
10 integrator loop having a register (105) and second clock (C3), where each cycle of the
11 second clock (C3) causes the integrated sum signal (y3) to by incremented by the signal
12 value of the sum signal y2).

1 8. A method according to Claim 6, wherein each time the second clock (C3)
2 cycles, the integrated sum signal (y3) is incremented, and, as the integrated sum signal
3 (y3) is incremented, the output signal (y) decreases, wherein the integrated sum signal
4 (y3) exponentially approaches the value held in the first register (100), while the output
5 signal (y) exponentially decreases.